Zootaxa 1372: 53–68 (2006)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

1372

Two new species of *Isbrueckerichthys* Derijst, 1996 (Siluriformes: Loricariidae) from the rio Paranapanema basin, Brazil

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Abstract

Two new *Isbrueckerichthys* species from Paranapanema river basin are described, *I. saxicola* and *I. calvus*, respectively from ribeirão Jacutinga and rio Taquara affluents. Both species present all diagnostic characters of the genus, and differ from their congeners by having bicuspid teeth (vs. simple teeth in *I. alipionis)*, hypertrophied odontodes along the lateral margin of head (vs. hypertrophied odontodes only at the anterior portion of snout in *I. epakmos*) and longer pectoral-fin spine and shorter caudal peduncle length in relation to *I. duseni*. The new species can be distinguished from each other by number of odontodes in each minute abdominal platelet (more than six in *I. saxicola* vs. at most six in *I. calvus*); by the presence of a plated area under the three first plates of the lateral line in *I. saxicola* vs. its absence in *I. calvus* in which this region is naked; by a exposed portion of cleithrum bordering the entire margin of the opercular opening in *I. saxicola* vs. bordering just the superior portion in *I. calvus*; and by presenting the exposed surface of supraoccipital plain or slightly convex in *I. saxicola* vs. strongly convex with an area without odontodes on the center in *I. calvus*.

Keywords: Neotropics, Paranapanema basin, Neoplecostominae.

Introduction

The genus *Isbrueckerichthys* was proposed by Derijst (1996) to include the species *Pareiorhaphis duseni* (Miranda Ribeiro, 1907) and *Pareiorhaphis alipionis* Gosline, 1947. This proposal was justified based on the discovery of an earlier type-species designation

Accepted by M. de Carvalho: 30 Oct. 2006; published: 4 Dec. 2006

by Regan (1920), which had fixed *Hemipsilichthys calmoni* Steindachner, 1907 as the type species of genus *Pareiorhaphis*, making *Pareiorhaphis* a synonym of *Hemipsilichthys* and dislocating *P. duseni* and *P. alipionis,* once they do not fit in the new designation (*sensu* Derijst 1996).

Isbrueckerichthys is composed of small- to medium-sized species (up to 90.2 mm SL) of loricariids (suckermouth armored catfishes). Although a phylogenetic diagnosis for *Isbrueckerichthys* is until now unavailable, this genus is distinguished from other neoplecostomines by a combination of characters: small naked area behind the pterotic-supracleithrum, abdomen with small platelets embedded in skin between pectoral girdle and pelvic-fin insertions, dorsal fin with one spine and seven branched rays, caudal peduncle ovoid in cross-section and lacking a series of papillae on the lower lip of the dentaries. Species of this genus are commonly found in small to medium headwater streams with clear, fast running, and well-oxygenated water, where the bottom is composed of rocks, boulders, and sometimes gravel (Pereira & Reis 2002).

The three described species of *Isbrueckerichthys* are recognized and thought to be endemic to the rio Ribeira de Iguape basin: *Isbrueckerichthys duseni* (Miranda Ribeiro, 1907) from the upper reaches of that basin in Paraná State, *I. alipionis* (Gosline, 1947), from the rio Betari, a tributary of rio Ribeira de Iguape and *I. epakmos* Pereira & Oyakawa, 2003 from a tributary of the rio Juquiá in São Paulo State.

In the present paper two new species of *Isbrueckerichthys* are described, both of them collected in headwater streams of rio Tibagi, rio Paranapanema basin, in Paraná State, Brazil. These species represent the first *Isbrueckerichthys* species in the Paraná River basin and an increase in the geographic distribution range of the genus.

Material and methods

Specimens examined belong to the Museu de Zoologia da Universidade Estadual de Londrina, Londrina, State of Paraná (MZUEL), Museu de Zoologia da Universidade de São Paulo, State of São Paulo (MZUSP) and Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, State of Rio Grande do Sul (MCP).

All measurements were taken point to point with digital calipers to the nearest 0.1 mm, under a dissecting microscope when necessary. Measurements and counts of bilaterally symmetrical features were taken from the left side of the body whenever possible; if a feature was missing or broken on the left side, it was examined on the right side.

Measurements follow Boeseman (1968), Muller, Mazzoni and Weber (2001), Weber (1985), Bockmann and Ribeiro (2003) and Pereira and Oyakawa (2003). Counts of median plate series were taken according to Schaefer (1997). Additional counts include: plates between dorsal and adipose fins (number of plates in dorsal series between last dorsal-fin branched ray insertion and origin of adipose-fin spine) and plates between adipose and

caudal fins (number of plates in dorsal series from just posterior to the adipose-fin membrane to the caudal fin). In case of missing teeth, the space left was counted as a tooth.

Standard length is expressed in mm. All other measurements are expressed as percents of standard length, except subunits of the head, which are expressed as percents of head length.

Key to the species of *Isbrueckerichthys*

1 Teeth of dentary and premaxilla without lateral cusp .... *I. alipionis* (Ribeira de Iguape River basin)
- Teeth of dentary and premaxilla with small lateral cusp 2
2. Mature males with a clump of hypertrophied odontodes only on anterior portion of snout ..... *I. epakmos* (Ribeira de Iguape River basin)
- Mature males with hypertrophied odontodes along the lateral margin of head 3
3. Short pectoral-fin spine (17.3–21.4 % SL) and long caudal peduncle length (34.6–38.2 % SL) ..... *I. duseni* (Ribeira de Iguape River basin)
- Long pectoral-fin spine (21.5–27.4 % SL) and short caudal peduncle length (26.4–30.0 % SL) 4
4. Minute abdominal platelets with much more than six odontodes; plated area under the first three plates of the lateral line; exposed portion of cleithrum bordering all the posterior margin of the opercular opening on lateral side of the body; exposed surface of supraoccipital plane or slightly convex..... *I. saxicola* **sp. n.** (Paraná River basin)
- Minute abdominal platelets with at most six odontodes; nude area under the first three plates of the lateral line; cleithrum not exposed, or when exposed, bordering just the superior portion of posterior margin of the opercular opening on lateral side of the body; exposed surface of supraoccipital strongly convex, with an area without odontodes at the center..... *I. calvus* **sp. n.** (Paraná River basin)

***Isbrueckerichthys saxicola*, new species**
Fig. 1.

Holotype. MZUEL 3716; 87.7 mm SL; male; Brazil; Paraná State; Londrina; rio Tibagi basin; ribeirão Jacutinga; 23º14´30”S/51º13´05”W; 18 August 2005; F. C. Jerep, E. S. da Silva, A. Souza.

Paratypes. (all from the same locality and collector as the holotype). MZUEL 3717; 3 (3) 59.7–84.7 mm SL; MCP 40209; 2 (2) 59.7-84.7 mm SL; collected with the holotype. MZUEL 3718; 1 (1) 77.8 mm SL; 31 March 2004; H. Mori, F. C. Jerep, E. S. da Silva, A. Souza. MZUSP 90803; 1 (1) 63.6 mm SL; 14 April 2005, F. C. Jerep, E. S. da Silva, A. Souza.

Diagnosis. *Isbrueckerichthys saxicola* can be distinguished from *I. alipionis* by having bifid teeth, with a small lateral cusp (vs. teeth simple, without lateral cusp). Differ from *I. epakmos* by mature males having margins of head with thin fleshy lobes (vs. soft and rugose fleshy area well developed on anterior portion of snout of mature males) and by the presence of short hypertrophied odontodes along the lateral margin of head (vs. presence of a clump of hypertrophied odontodes located only on anterior portion of snout, directed forward or slightly upwards). Differ from *I. duseni* by having longer pectoral-fin spine (23.0–27.4 vs. 17.3–21.4 % SL) and shorter caudal peduncle length (27.3–30.0 vs. 34.6–38.2 % SL). Differ from *I. calvus* by having minute abdominal platelets with frequently about 12 odontodes (vs. minute abdominal platelets with at most six odontodes); plated area under the first three plates of the lateral line (Fig. 3) (vs. naked area under the first three plates of the lateral line); exposed portion of cleithrum bordering the posterior margin of the opercular opening on lateral side of the body (Fig. 3) (vs. cleithrum not exposed, or when exposed, bordering just the superior portion of posterior margin of the opercular opening); and exposed surface of supraoccipital flat or slightly convex (vs. exposed surface of supraoccipital strongly convex with an area without odontodes at the center).

Description. Counts and proportional measurements presented in Table 1. Dorsal surface of the body covered by plates except for naked area around dorsal fin. Body moderately depressed. Progressively narrowing from cleithrum to end of caudal peduncle. Dorsal profile of the body slightly convex, rising from snout tip to origin of dorsal fin and descending from this point to end of caudal peduncle. Trunk and caudal peduncle mostly ovoid in cross-section, slightly flattened ventrally and more compressed caudally. Greatest body depth at nuchal plate. Ventral surface of the head, region from pelvic-fin insertion to anal-fin origin and around the anal fin totally naked. Abdomen covered by minute platelets, most of them bearing more than 6 odontodes (frequently about 12), scattered between posterior margin of lower lip and insertion of pelvic fin.

Head broad and depressed. Anterior profile of head slightly triangular to roundish in dorsal view, more rounded in mature males. Three slightly elevated ridges between orbits and snout tip, lateral ridges more prominent. Dorsal region between orbits concave; upper margin of the orbit slightly elevated; supraoccipital dorsal surface plane, sometimes slightly convex. Eye moderately small dorsolaterally placed. Iris with minute dorsal flap covering pupil. Margins of head covered by minute odontodes; mature males with thin fleshy lobes and short hypertrophied odontodes along the lateral margin of head. Lips roundish and well developed, occupying most of ventral surface of head. Lower lip reaching pectoral girdle and covered with minute papillae, which decrease in size towards its edge. Papillate surface of lower lip projecting between dentary and premaxillary rami. Maxillary barbel short, coalesced with lower lip and ornamented with small papillae. Teeth small and bicuspid, inner cusp slightly curved inwards. Lateral cusp small, not reaching half-length of inner cusp (three times shorter than inner cusp).

TABLE 1. Morphometrics and meristics data for *Isbrueckerichthys calvus* and *I. saxicola*.

	I. calvus			*I. saxicola*		
Character	Holotype	n = 17	X ± SD	Holotype	n = 6	X ± SD
Standard length (mm)	87.3	42.4–90.2		87.7	59.7–87.7	
Percents of standard length						
Head length	31.6	31.4–35.0	33.05 ± 0.95	31.6	31.6–35.0	32.56 ± 1.24
Predorsal length	41.9	40.6–43.7	42.60 ± 0.81	40.8	40.8–45.9	42.82 ± 1.77
Postdorsal length	44.5	38.2–45.9	42.35 ± 2.27	44.2	39.7–44.2	42.37 ± 1.84
Dorsal-fin spine length	20.4	19.7–24.0	21.75 ± 1.39	22.0	18.8–22.0	20.50 ± 1.25
Anal-fin spine length	18.1	14.8–19.5	17.27 ± 1.22	18.1	14.6–18.1	15.66 ± 1.30
Pectoral-fin spine length	24.2	21.5–26.4	24.13 ± 1.53	27.4	23.0–27.4	24.47 ± 1.60
Pelvic-fin spine length	19.5	18.6–22.8	20.44 ± 1.17	22.5	19.6–22.5	20.94 ± 0.99
Adipose-fin spine length	8.7	7.3–10.6	9.01 ± 0.78	7.5	5.9–7.5	6.51 ± 0.60
Upper caudal-fin ray	19.6	17.2–27.9	21.69 ± 3.28	24.0	20.8–24.0	22.37 ± 1.26
Lower caudal-fin ray	20.5	18.6–29.6	24.21 ± 3.27	24.4	21.7–26.6	24.64 ± 1.93
Trunk length	16.9	15.9–19.4	17.55 ± 1.04	16.6	16.6–18.5	17.36 ± 0.72
Abdominal length	26.5	24.2–28.9	26.36 ± 1.28	25.2	25.1–26.2	25.54 ± 0.49
Cleithral width	30.3	29.0–31.5	29.95 ± 0.62	28.9	28.9–30.9	29.78 ± 0.74
Body depth at dorsal origin	19.3	18.8–22.2	20.79 ± 1.16	20.5	17.7–20.5	18.92 ± 0.98
Body width at dorsal origin	24.6	20.9–26.9	24.21 ± 1.46	23.2	21.7–24.2	23.18 ± 0.83
Body width at anal origin	16.8	13.2–16.8	15.20 ± 0.89	14.7	12.0–14.7	13.15 ± 0.86
Caudal peduncle length	27.9	26.4–29.7	28.24 ± 1.03	29.1	27.3–30.0	28.77 ± 0.93
Caudal peduncle depth	10.1	8.6–10.3	9.46 ± 0.40	8.7	8.3–8.9	8.65 ± 0.25
Caudal peduncle width	9.3	5.3–9.3	7.24 ± 0.95	6.7	5.6–6.8	6.44 ± 0.48
Percents of head length						
Snout length	67.2	60.5–67.5	64.10 ± 1.91	66.2	63.6–66.2	64.80 ± 1.00
Orbital diameter	11.7	11.2–14.5	12.41 ± 0.88	12.0	10.8–12.6	11.86 ± 0.59
Least interorbital width	32.8	27.5–36.4	31.11 ± 2.59	32.2	29.7–32.2	31.22 ± 0.84
Least internostril width	10.6	9.9–12.1	10.84 ± 0.51	10.0	9.5–11.3	10.33 ± 0.65
Eye-nostril distance	15.0	12.6–15.5	14.02 ± 0.89	13.1	12.5–15.0	13.48 ± 0.90
Head depth	61.8	53.4–62.9	58.31 ± 3.01	63.0	54.1–63.0	58.40 ± 3.25
Oral disk width	58.3	52.0–65.9	59.65 ± 3.37	66.6	54.2–68.6	61.57 ± 5.94
Mandibular ramus	21.0	17.2–23.3	20.34 ± 1.83	17.6	17.6–21.7	19.83 ± 1.65
Counts						
Median plates series	27	27–29	27.9 ± 0.66	30	29–30	29.67 ± 0.52
Dorsal plates below dorsal-fin base	6	6–7	6.59 ± 0.51	8	7–8	7.50 ± 0.55
Dorsal median unpaired plates	1	1–2	1.41 ± 0.51	2	1–2	1.67 ± 0.52
Plates between dorsal/adipose	8	7–9	7.82 ± 0.73	8	8–10	8.50 ± 0.84

TABLE 1 (continued).

	I. calvus			*I. saxicola*		
Character	Holotype	n = 17	X ± SD	Holotype	n = 6	X ± SD
Plates between adipose/caudal	7	7–8	7.59 ± 0.51	7	7–8	7.50 ± 0.55
Ventral plates above anal-fin base	4	3–4	3.82 ± 0.39	4	3–4	3.33 ± 0.52
Ventral plates between end of anal-fin base and caudal-fin	12	11–14	12.24 ± 0.75	14	14–15	14.33 ± 0.52
Dorsal-fin branched rays	6	6–7	6.90 ± 0.24	7	6–7	6.50 ± 0.55
Pectoral-fin branched rays	6	6–6	6.00 ± 0	6	6–6	6.00 ± 0
Pelvic-fin branched rays	5	5–5	5.00 ± 0	5	5–5	5.00 ± 0
Anal-fin branched rays	5	5–5	5.00 ± 0	5	5–5	5.00 ± 0
Caudal-fin rays	14	14–14	14.00 ± 0	14	14–14	14.00 ± 0
Premaxillary teeth	33	28–43	34.41 ± 4.61	37	36–42	38.50 ± 2.17
Dentary teeth	29	27–46	33.76 ± 5.34	33	33–41	36.17 ± 2.86

Cleithrum partially exposed, extending from pectoral-fin insertion to ventral margin of pterotic-supracleithrum, bordering the posterior margin of opercular opening on lateral side of body. Exposed portion of the cleithrum tight ventrally becoming broad on its dorsal extremity. Region below three initial plates of lateral line (just posterior to pterotic-supracleithrum) plated with three to five small platelets.

Dorsal fin originating on vertical line passing through pelvic-fin origin, and finishing on vertical line passing through anal-fin origin; nuchal plate present; dorsal-fin spinelet absent, although some specimens have it, locking mechanism non-functional (Fig. 3). Dorsal-fin spine moderately flexible. Adipose fin present, preceded by one to two median, unpaired pre-adipose azygous plates. Pectoral fin moderate in size; with curved and depressed spine, which have a short extension of skin on its tip; spine covered with short hypertrophied odontodes, mainly on its lateral and ventral surface; dorsal surface with discrete dermal flap along its entire length. First and second branched rays as long as the spine. Subsequent branched rays reduced gradually in size, last ray less than half length of first one. Posterior margin of pectoral fin straight, overlapping approximately half-length of pelvic fin when adpressed. Pelvic fin moderate in size, not reaching insertion of anal fin when adpressed. Pelvic-fin spine depressed, covered with minute odontodes ventrally and laterally; dermal flap on its dorsal surface, extending to spine tip. Anal fin with the first ray unbranched. Distal profile of caudal fin concave, lower lobe slightly longer than upper.

One peculiar feature was observed in two specimens of *I. saxicola*. They have the dorsal-fin spinelet reduced to a rectangular platelike structure, just like mentioned by Armbruster (2004) as present in most neoplecostomines. It is the first time that this structure is observed into the genus (Pereira & Reis 2002; Pereira & Oyakawa 2003; Armbruster 2004; Pereira 2005).

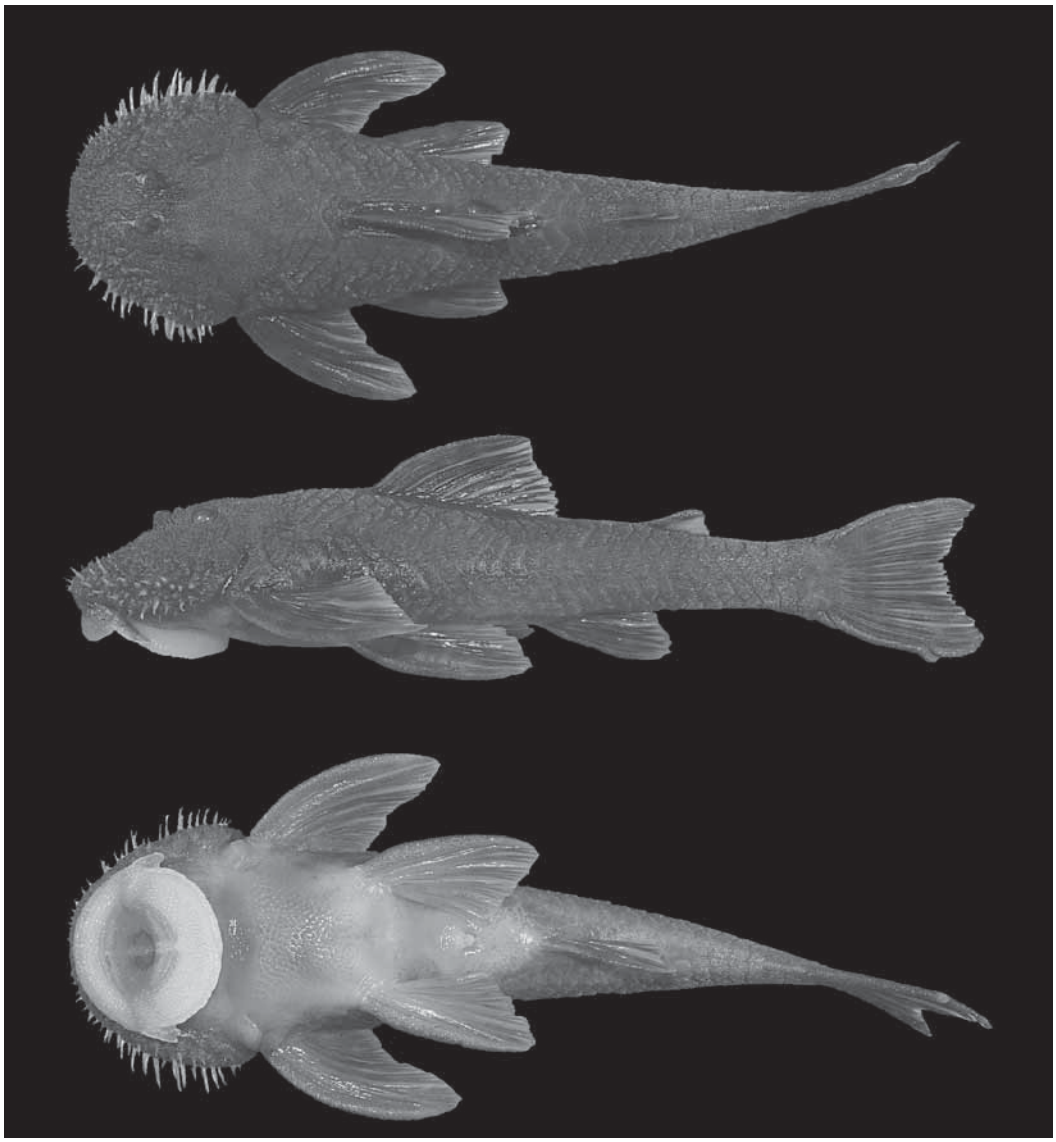

FIGURE 1. *Isbrueckerichthys saxicola*, holotype, MZUEL 3716, male, 87.7 mm SL. Brazil: State of Paraná: Londrina: rio Tibagi basin, ribeirão Jacutinga.

Color in alcohol. Ground color of upper surface of head and body brown or grayish brown; pale yellow ventrally. Dorsum and flanks mostly plain but sometimes with dark brown blotches of various sizes and shapes, associated with lighter blotches irregularly arranged. Dorsal light blotches sometimes arranged to form four inconspicuous saddles on dorsum at dorsal-fin origin, at posterior portion of dorsal-fin base, between end of dorsal fin and adipose fin, and between adipose and caudal fins. Lighter vertical thin blotch on the lateral side in the end of caudal peduncle, sometimes not continuous. Ventral margin of head and outer portion of upper lip homogeneously light brownish; ventral portion of

caudal peduncle dusky, sometimes with small brown blotches. Ventral surface unpigmented between head and anal-fin origin. Spines of dorsal, pectoral, pelvic, anal and caudal fins grayish brown with four to six dark spots; branched fin rays with two to three spots, forming transverse stripes; interradial membrane of fins hyaline.

Distribution. This species is only known from the headwater of ribeirão Jacutinga, in low rio Tibagi basin, Paraná State, Brazil (Fig. 4).

Etymology. The species name *saxicola*, a Latin adjective, means living among the rocks, in allusion to the habitat where they are found (under the rocks in the bottom of the rivers).

Ecological notes. The type locality where all specimens of *Isbrueckerichthys saxicola* were collected is a small creek located near the urban area of Londrina city, flowing through a landscape of mixed open fields and riparian vegetation, sometimes with a very degraded margin. Grass or other vegetation is usually present on the margins. The stretch sampled is narrow (about two to four meter wide) and shallow (about 0.2–1.0 m deep). The stream bottom was rocky, with small to medium-sized rocks, loose stones and gravel; sometimes with sand and mud on the small pools bottom. The water was clear to turbid and moderate to strong flowing. The fishes are usually found on the bottom among rocks and stones.

The discovery of *I. saxicola* was unusual considering the fact that the type locality (ribeirão Jacutinga) is an urban and degraded stream. The only six specimens of this species was collected in a not polluted short parcel (about 50 m, with rock bottom and fast flow) of the stream´s headwater, them were not found on the rest of the stream or on neighbors streams. It appears that both new species are not tolerant to polluted or not oxygenated waters, just like theirs congeners (Oyakawa *et al*. 2006).

The following species occur syntopically with *Isbrueckerichthys saxicola*: *Apareiodon ibitiensis* (Steindachner); *Astyanax altiparanae* Garutti & Britski; *Astyanax eigenmanniorum* (Cope); *Bryconamericus iheringii* (Boulenger); *Characidium gomesi* Travassos; *Hisonotus depressicauda* (Miranda Ribeiro); *Hypostomus ancistroides* (Ihering), *Hypostomus nigromaculatus* (Schubart), *Hypostomus regani* (Ihering), *Imparfinis schubarti* (Gomes); *Oreochromis niloticus* (Hasselquist), *Poecilia reticulata* Peters and *Rhamdia quelen* (Quoy & Gaimard).

***Isbrueckerichthys calvus*, new species**
Fig. 2.

Holotype. MZUEL 3714; 87.3 mm SL; male; Brazil; Paraná State; Apucarana; rio Tibagi basin; córrego Juruba; 23º34’44.6”S/51º22’12.6”W; 08 September 2005; F. C. Jerep, E. S. da Silva, A. Souza.

Paratypes. MZUEL 3724; 9 (6) 65.5–90.2 mm SL; MCP 40208; 2 (2) 72.55-86.24 mm SL; collected with the holotype. MCP 40207; 2 (2) 46.36-67.08 mm SL; Califórnia; rio Tibagi basin; ribeirão Água dos Oito; 21 October 2004; F.C. Jerep, E.S. da Silva, A.

Souza. MZUSP 90804; 3 (3) 63.0–73.5 mm SL; Apucarana; rio Tibagi basin; córrego Juruba; 23º33'58.2"S/51º24'17.4"W; 08 September 2005; F.C. Jerep, E.S. da Silva, A. Souza. MZUEL 3638; 5 (4) 42.4–78.8 mm SL; Califórnia; rio Tibagi basin; ribeirão Água dos Oito; 21 October 2004; F. C. Jerep, E. S. da Silva, A. Souza. MZUEL 3715; 1 (1) 65.6 mm SL; Califórnia; rio Tibagi basin; ribeirão Água dos Oito; 19 Oct 2000; A. Souza.

Diagnosis. *Isbrueckerichthys calvus* can be distinguished from *I. alipionis* by having bifid teeth, with a small lateral cusp (vs. teeth without lateral cusp). Differ from *I. epakmos*, by mature males having margins of the head with thin fleshy lobes (vs. soft and rugose fleshy area well developed on anterior portion of snout of mature males) and by the presence of short hypertrophied odontodes along the lateral margin of head (vs. presence of a clump of hypertrophied odontodes located only on anterior portion of snout, directed forward or slightly upwards). Differ from *I. duseni* by having a longer pectoral-fin spine (21.5–26.4 % vs. 17.3–21.4 % SL) and a shorter caudal peduncle length (26.4–29.7 % vs. 34.6–38.2 % SL). Differ from *I. saxicola* by having minute abdominal platelets with at most six odontodes (vs. minute abdominal platelets with much more than six odontodes, frequently 12); nude area under the first three plates of the lateral line (Fig. 3) (vs. plated area under the first three plates of the lateral line); cleithrum not exposed, or when exposed, bordering just the superior portion of posterior margin of the opercular opening on lateral side of the body (Fig. 3) (exposed portion of cleithrum bordering all the posterior margin of the opercular opening); exposed surface of supraoccipital strongly convex, with an area without odontodes on the center (vs. exposed surface of supraoccipital plane or slightly convex).

Description. Counts and proportional measurements presented in Table 1. Dorsal surface of the body covered by plates except for naked area around dorsal fin. Body moderately depressed. Progressively narrowing from cleithrum to end of caudal peduncle. Dorsal profile of the body slightly convex, rising from snout tip to origin of dorsal fin and then descending to end of caudal peduncle. Trunk and caudal peduncle mostly ovoid in cross-section, slightly flattened ventrally and more compressed caudally. Greatest body depth at dorsal-fin origin. Ventral surface of the head, region from pelvic-fin insertion to anal fin origin and around the anal fin totally naked. Abdomen covered by minute platelets, bearing at most six odontodes (frequently about three), scattered between posterior margin of lower lip and insertion of pelvic fin; sometimes concentrated in central area of abdomen.

Head broad and depressed. Anterior profile of head slightly triangular to roundish in dorsal view, more rounded in mature males. Three slightly elevated ridges between orbits and snout tip, lateral ridges more prominent. Dorsal region between orbits concave; upper margin of the orbit slightly elevated; supraoccipital dorsal surface strongly convex, with an area without odontodes at the center. Eye moderately small dorsolaterally placed. Iris with minute dorsal flap covering pupil. Margins of head covered by minute odontodes; mature males with thin flesh lobes and short hypertrophied odontodes along the lateral margin of head. Lips roundish and well developed, occupying most of ventral surface of

head. Lower lip reaching pectoral girdle and covered by minute papillae, which decrease in size towards its edge. Papillate surface of lower lip projecting between dentary and premaxillary rami. Maxillary barbel short, coalesced with lower lip and ornamented with small papillae. Teeth small and bicuspid, inner cusp slightly curved inwards. Lateral cusp small, not reaching half-length of inner cusp (three times shorter than inner cusp).

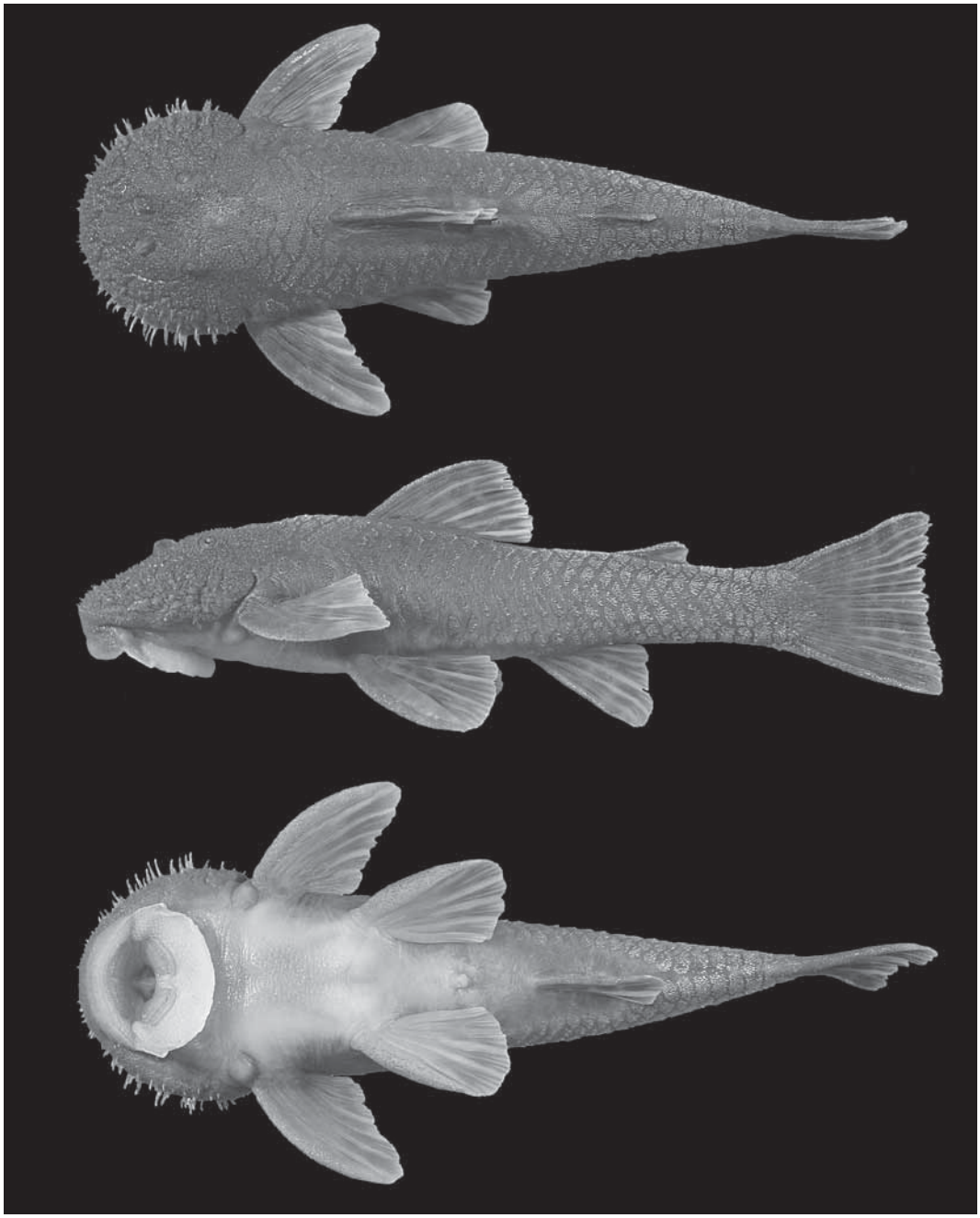

FIGURE 2. *Isbrueckerichthys calvus*, holotype, MZUEL 3714, male, 87.3 mm SL. Brazil: State of Paraná: Apucarana: rio Tibagi basin, córrego Juruba.

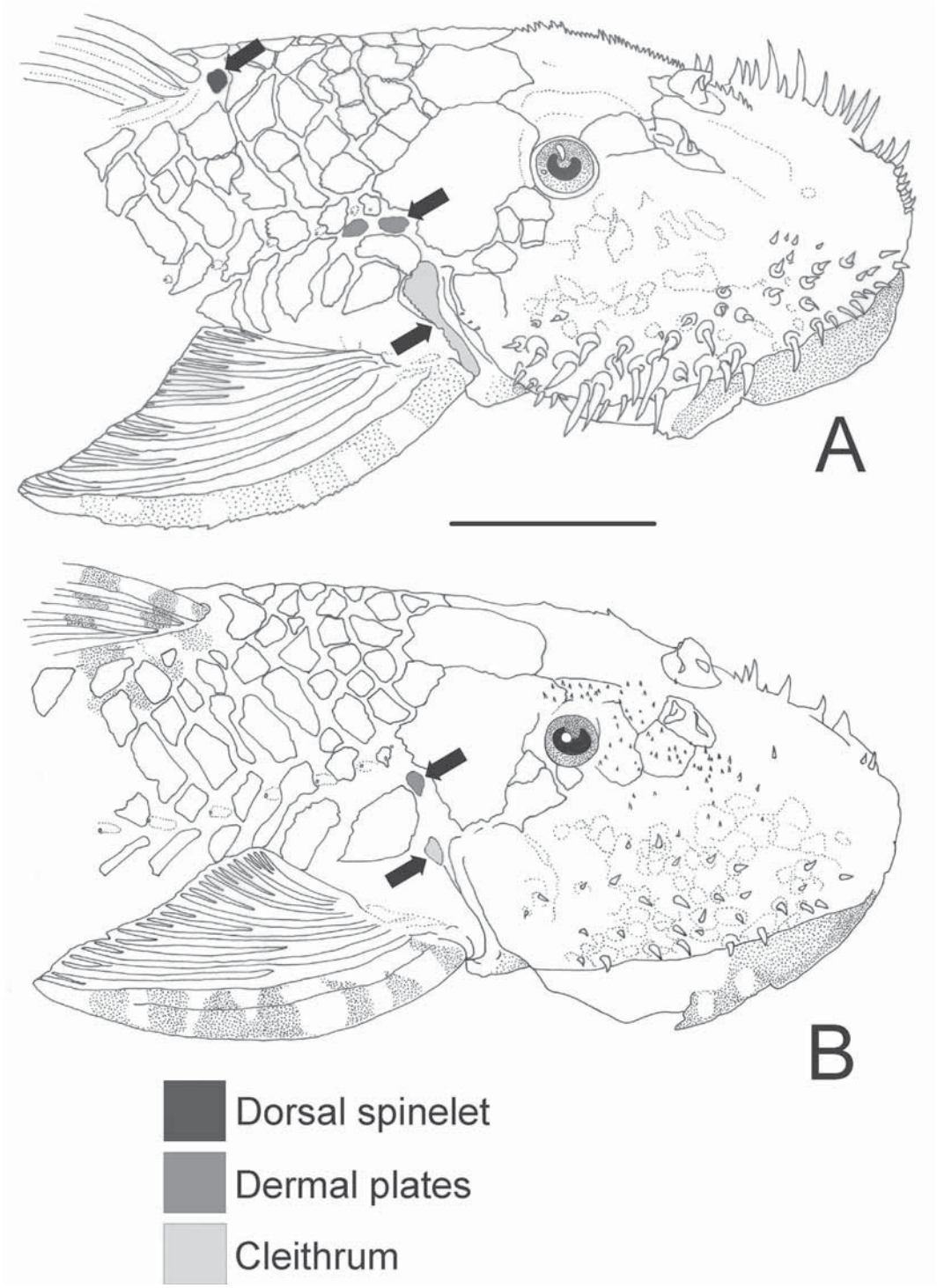

FIGURE 3. *Isbrueckerichthys saxicola*, holotype, MZUEL 3716, (A) and *Isbrueckerichthys calvus*, MZUEL 3638 (B). Cleithrum (exposed or not), presence of plates under the three first plates of the lateral line and presence of dorsal spinelet. Bar = 1cm.

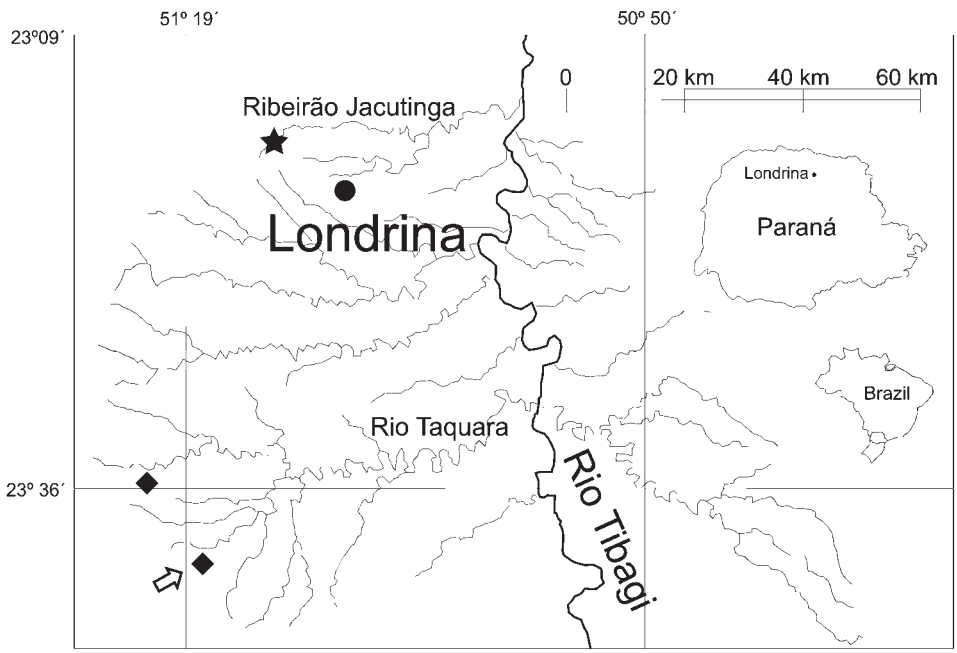

FIGURE 4. Type-locality of *Isbrueckerichthys saxicola* (star = ribeirão Jacutinga) and *I. calvus* (diamond = córrego Juruba) (arrow = Água dos Oito) on rio Tibagi basin, State of Paraná, Brazil.

Cleithrum not exposed, or partially exposed only bordering the ventral margin of pterotic-supracleithrum. Region below the three initial plates of the lateral line (just posterior to the pterotic-supracleithrum) nude.

Dorsal fin originating on vertical line passing through pelvic-fin origin, and finishing on vertical line passing through anal-fin origin; nuchal plate present, spinelet and locking mechanism absent. Dorsal-fin spine moderately flexible. Adipose fin present, preceded by one or two median, unpaired pre-adipose azygous plates. Pectoral fin moderate in size; with curved and depressed spine, which have a short extension of skin on its tip; spine covered with short hypertrophied odontodes, mainly on its lateral and ventral surface; dorsal surface with discrete dermal flap along its entire length. First and second branched rays as long as the spine. Subsequent branched rays reduced gradually in size, last ray less than half length of first one. Posterior margin of pectoral fin straight, overlapping approximately half-length of pelvic fin when adpressed. Pelvic fin moderate in size, not reaching insertion of anal fin when adpressed. Pelvic-fin spine depressed, covered with minute odontodes ventrally and laterally; well developed dermal flap on its dorsal surface, extending to spine tip. Anal fin with the first ray unbranched. Distal profile of caudal fin concave, but some mature specimens presented it straight; lower lobe slightly longer than upper.

Color in alcohol. Ground color of upper surface of head and body grayish or dark brown; pale yellow ventrally. Dorsum and flanks mostly plain but sometimes with dark

brown blotches of various sizes and shapes, associated with lighter blotches irregularly arranged. Dorsal light blotches sometimes arranged to form four inconspicuous saddles on dorsum: on origin of dorsal fin, on posterior portion of dorsal-fin base, between end of dorsal-fin and adipose fin, and between adipose and caudal fins. A lighter vertical thin blotch on the lateral side in the end of caudal peduncle, sometimes not continuous. Ventral margin of head, outer portion of upper lip, and ventral portion of caudal peduncle dusky. Ventral surface unpigmented between head and anal-fin origin. Spines of dorsal, pectoral, pelvic, anal and caudal fins grayish or with four to six dark spots; branched fin-rays with two to four dark brown spots, forming transverse stripes; interradial membrane of fins hyaline.

Distribution. This species is only known from córrego Juruba and ribeirão Água dos Oito, affluents of rio Taquara, rio Tibagi basin, Paraná State, Brazil (Fig. 4).

Etymology. The species name *calvus*, a Latin adjective, means bald, in allusion to the area on the head, without odontodes.

Ecological notes. The type locality where some specimens of *Isbrueckerichthys calvus* were collected is a small creek of rural region, flowing through a landscape of mixed open field, riparian vegetation and forest, sometimes with a very degraded margin. Grass or other vegetation is usually present on the margins. The stretch sampled is narrow (about 2–4 m wide) and shallow (about 0.2–0.5 m deep). The stream bottom was rocky, with small to medium-sized rocks, loose stones and gravel; and some small pools along the stream with sand and mud on the bottom. The water was clear to turbid and moderate to fast flowing. The fishes were usually found along the bottom among rocks and stones, just under small waterfalls.

The following species occur syntopically with *Isbrueckerichthys calvus*: *Hypostomus ancistroides* (Ihering), *Neoplecostomus* sp. and *Rineloricaria pentamaculata* Langeani & Araujo.

Comments. Another character that also helps to distinguish both species herein described is the greater number of plates in the following counts of *Isbrueckerichthys saxicola*: median plate series, dorsal plates below dorsal-fin base, plates between end of dorsal-fin base and adipose fin, and ventral plates between end of anal-fin base and caudal fin (Table 1). On the other hand, *Isbrueckerichthys calvus* has a more robust body, with plates more evenly spaced covering the dorsal surface of the body.

Comparative material

Hemipsilichthys nimius: Brazil: Rio de Janeiro State: Parati: Perequê-Açu basin: MCP 33049, holotype, male, 105.1 mm SL; rio Carrasquinho below the Cachoeira do Tobogã at Penha, ca. 7.5 km West of highway BR101, on road from Parati to Cunha. — MCP 31990, paratype, 11, 45.7–98.1 mm SL; collected with the holotype. *Hemipsilichthys stephanus*: Brazil: Minas Gerais State: MZUSP 36971, holotype, 97.1 mm SL; Ribeirão das Pedras,

tributary of rio Jequitinhonha, ca 1300 m asl, 3 km N of Diamantina. *Isbrueckerichthys epakmos*: Brazil: São Paulo: Tapiraí: rio Ribeira de Iguape drainage: MZUSP 79804, holotype, male, 103.1 mm SL; rio Verde at Piúva, on road to Rio Verde, 23º58'22"S 47º34'23"W. — MZUSP 79498, paratypes, 4 (1) 33.2–66.7 mm SL; collected with the holotype. — MZUSP 78444, 6 (4) 28.1–78.2 mm SL; Ibiúna: creek tributary of rio Juquiá at Cachoeira da Fumaça, 24º2'18"S 47º14'53"W. — MCP 28276, 63 (20) 39.5–83.3 mm SL; Tapiraí: rio Coruja, tributary to rio Juquiá, on road from Tapiraí to Juquiá near Cachoeira do Chá, 24°1'47"S 47°34'29"W. *Isbrueckerichthys duseni*: Brazil: Paraná State: rio Ribeira de Iguape basin: MCP 20128, 14, 23.5–95.2 mm SL; rio Piedade on road from Rio Branco do Sul to Açungui, ca. 26 km WNW of Rio Branco do Sul. — MCP 12557, 20 (7), 28.6–98.8 mm SL; ribeirão Pulador, 3 km S of Campinhos on highway BR 476, Cerro Azul. — MCP 12564, 28 (7), 23.8–91.1 mm SL; ribeirão Pocinha, 4 km S of Tunas on highway BR 476, Bocaiúva do Sul. *Isbrueckerichthys alipionis*: Brazil: São Paulo State: rio Ribeira de Iguape basin: MCP 19607, 21 (5), 70.0–81.5 mm SL; rio Betari at Parque Estadual Turístico do Alto Ribeira, Iporanga. — MCP 20122, 6, 38.7–80.7 mm SL; Córrego Areias, ca 1 km SE from Bairro da Serra, on road from Apiaí to Iporanga. — MZUSP 58550, 33 (4), 74.9–80.2 mm SL; rio Betari near the Parque Estadual Turístico do Alto Ribeira, Iporanga. — MCP 26952, 24, 29.2–86.8 mm SL; rio Betari, Iporanga. *Kronichthys subteres*: Brazil: São Paulo State: Iporanga: rio Ribeira de Iguape basin: MCP 20150, 32, 38.1–76.8 mm SL; córrego Areias, ca 1 km SE from Bairro da Serra, on road from Apiaí to Iporanga. *Neblinichthys pilosus*: Venezuela: Territorio Federal Amazonas: Dept. Río Negro: río Baria basin: MZUSP 35217, Paratypes, 2, 48.0–50.6 mm SL, río Mawarinuma tributary, at Neblina base camp, on rigth bank in riffle. *Neoplecostomus paranensis*: Brazil: São Paulo: Cajuru: MZUSP 38572; holotype; 1 (1) , 71.77 mm SL; rio Cubatão. *Neoplecostomus microps*: Brazil: São Paulo State: rio Paraíba do Sul basin: MCP 20069, 4, 47.1–89.3 mm SL; Ribeirão Benfica at Benfica, ca 1 km from Piquete. — MCP 20071, 13, 45.1–98.3 mm SL; Ribeirão Macacos at Bairro dos Macacos, tributary of rio Paraitinga, Silveiras. *Pareiorhaphis parmula*: Brazil: Paraná: Lapa: rio Iguaçu basin: MCP 35826, holotype, male, 93.3 mm SL; rio dos Patos, tributary to rio da Várzea, on road PR-427 from Lapa to Campo do Tenente, 25º50'36.8"S 049º43'39.2"W. — MCP 35827, paratypes, 59 + 2 c&s (29) 45.7–94.5 mm SL and MHNCI 10883, 3 (1) 59.6–73.6 mm SL; all collected with the holotype. — MCP 35556, 10 (7) 39.6–86.5 mm SL; rio dos Patos, tributary to rio da Várzea, Lapa, 25º50'38"S 49º43'39"W. *Pareiorhina rudolphi*: Brazil: São Paulo State: Piquete: rio Paraíba do Sul basin: MCP 18052, 23 + 1 c&s, 30.4–49.3 mm SL; creek tributary of rio Piquete at Benfica.

Acknowledgments

The authors are very grateful to Jonathan W. Armbruster (Auburn University) for comments and suggestions on the manuscript. To Francisco Langeani Neto for valuable

discussions. Special thanks to Edson Santana, Aparecido de Souza, Horácio Mori and Wanner Galves for their help and dedication on fieldwork. This paper is part of the Master thesis of Jerep, F. C., supported by CAPES and Programa de Pós-graduação da Universidade Estadual de Londrina. The collection of fishes was authorized by IBAMA (autorização no. 083/2003). The authors are collaborators of ACSI project (NSF DEB-0315963).

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